

great depth; and likewise the summer thaws, aided by the enormous precipitation which characterized those regions and times. And it is equally obvious that a mass of water-saturated earth, in freezing and thawing, must be subject to the same laws of movement as a true glacier, the rate of motion being proportioned to the quantity of water. The depth of some of these deposits at first presented a difficulty, this depth rising in some cases to twenty and even thirty feet, although they are for the most part less than half that depth. But after learning that in Vermont, in the winter of 1874-5, the frost penetrated to a depth of eight feet, and that in Siberia and other subarctic regions the ground is annually frozen and thawed to a much greater depth, there seemed to remain no part of the phenomena presented by these beds which is not satisfactorily accounted for by the theory.

The occasion of his bringing this subject to the attention of the Academy was this: In passing an excavation on Market Street, above Forty-Fourth Street, he had observed a new and striking confirmation of the view just presented. In an accumulation quite like those already described as occurring in North Carolina, this additional feature was observed: several banded seams of decomposed mica schist, standing nearly vertical in the undisturbed rock below, on reaching the lower edge of the drift were bent at a sharp angle, in the direction of the movement of the mass, down the slope, and were traceable many feet, diminishing with a gradual and regular taper in a horizontal direction, until lost in the homogeneous mass of earth which formed the body of the bed. How this happened is obvious enough on the theory given, but on no other known to him.

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AUGUST 8.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

*On the Diurnal Opening of Flowers.*—Mr. THOS. MEEHAN referred to observations he had made this season on the nocturnal and diurnal expansion of flowers, and said that, contrary to the popular impression, it was not probable that light or its absence alone determined the opening of the blossoms. There were some plants, as, for instance, *Enothera biennis*, the evening Primrose; *Anagallis arvensis*, the "Pimpernel," and others, which remained open or otherwise longer when the weather was humid or cloudy, and were looked on in consequence as kinds of floral barometers; but from other facts it was clear that it was not the weather merely, but some other incident accompanying the weather that governed the case.

For instance, though *Enothera biennis*, and other *Enotheras*,

opened at evening, and, if the atmosphere be moist, continue open the greater part of next day, many species opened only in the daytime; and this they did regularly, quite regardless of meteorological conditions. *Æ. serrata* of Colorado was one of these. It was regular in opening about noon; the blossoms were all closed long before sundown.

In other allied families we saw similar divergence. In the Cactus family, *Opuntia* and *Mammillaria* opened only about mid-day; while most of the *Cereus* opened at night. The night-blooming Cactus was a familiar example. But the chief interest was in the fact that many had their special hours of day or night for the expansion. The *Portulaca oleracea*, common Purslane, opened about eight A. M., and by nine had performed all its functions; while a closely allied plant, the *Talinum teretifolium*, from the serpentine rocks of Chester County, opened at one P. M., and was closed by three. The conditions of the weather did not seem to influence them.

There was the same attention to daily periods in the growth of the parts of plants, as well as in the expansion of the petals. In composite plants the floral growth was generally in the morning, and was usually all over by nine or ten o'clock A. M. The elongation and expansion of the corolla was usually completed in an hour after sunrise, but the stamens grew for an hour more, and the pistil continued for still another. There was little if any growth in the floral parts after nine o'clock in a very large portion of this order of plants.

In grasses, *Cyperaceæ*, and some rushes also, the floral parts were very exact in their time of opening. In the plantains (*Plantago*) the pistils appeared a day or more in advance of the stamens; and these last appeared at about a regular time in each day. In *Luzula campestris*, the wood rush, he had by a series of observations timed it exactly. Before nine the anthers were perfect, but by ten the pollen has been all committed to the winds, and only dried membranous matter remained. So far as he could ascertain, meteorological conditions did not influence the time in the least in this case.

The popular impression of light and moisture as agents in this behavior, had seemed to receive a tacit scientific assent. It was clear, he thought, there was a more powerful agency underlying these; and it was, perhaps, a gain to science to be able to see this, though in so dim a light.

Dr. Henry C. Chapman was elected curator in the place of Mr. Tryon, resigned.